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NATURAL HISTORY IN THE GRADES

OTIS W. CALDWELL
The University of Chicago

VII AND VIII. SEVENTH AND EIGHTH GRADES

Pupils of the ages usually found in the seventh and eighth grades are much interested in those aspects of elementary science which appear in the home and community. Evidence of this attitude is seen in frequent inquiry as to how certain common phenomena occur and as to how the pupil's constructive ability may be applied to bringing about results with these common materials. This is not a new attitude. It is the inquiring and investigative attitude of the previous grades intensified by a larger outlook, and made more real to the pupil by his demand for a rational interpretation of common things. In the sixth grade all the previous experiences with plants and animals were used as the basis for an elementary study of the human body, its proper use and care. This was the elementary science of physiology and hygiene—of bodily efficiency. The same background is now used for consideration of the elementary science of the home and community. The sixth-grade elementary hygiene and the elementary-science topics of the seventh and eighth grades are educationally closely related.

Topics that are appropriate for study in these grades vary with the region. In an agricultural community emphasis may well be placed upon elementary agricultural science, while in other communities other industries and interests furnish vital problems. Some of the essential elementary problems, however,

are almost universal. Topics of importance that are not readily divisible into agricultural and manufacturing groups are: the phenomena of boiling, refrigeration, distillation, solution, crystallization, water supplies, steam and its applications, heating and heating systems, heat measurements, the atmosphere, chlorophyll work of plants, the most important plants in the world's food supply, the domestication of plants and animals, energy and the machines by means of which work is done. They are of universal importance, and if studied in an experimental and investigative manner and not didactically they have universal educational value.

There are at least three factors that must be kept in mind as essential for work in these grades. They are: first, the possibility of experimentation which may be performed in such a way that accurate observation and inference may be required; second, the constructive and inventive capacity of pupils must be called forth, preferably by actually demanding that they devise some apparatus, and at the least by demanding interpretation of processes and apparatus devised by others; third, the topics must involve knowledge that appeals to the pupils as being worth while. On this last point it must be recalled that pupils of this age are not so much interested in a scientific arrangement of facts as they are in learning about the scientific import of common matters. Facts as children see them are not classified into the different grooves that we choose to call the different sciences, but they see the topics of interest and desire an interpretation of the phenomena that are involved regardless of the particular science that is needed for the explanation. It may be questioned whether some of the topics suggested allow all three of these factors to be used. Certainly the proportionate use will vary. In such a topic, however, as the history of the domestication of plants and animals, printed matter must be looked upon as the records of the experiments of others; and illustrative material—charts, pictures, etc.—must be secured therefrom so that a connected story of any given plant or animal may be constructed. One seventh-grade boy in his work collected a large stack of pamphlets, made lantern slides, and presented to his fellows

several highly interesting discussions upon the sugar-producing plants of the world, thus showing that printed statements may be very real things and may become the basis of new constructive effort in the form of a graphic report.

It is important throughout this work that the pupils keep carefully made notes upon experiments and observations. A notebook specially for the elementary science should be kept. This will not only be of great advantage in securing careful attention and accurate observation but should give at this early period methods of recording things in brief, pointed, and well-written notes. This book should also contain, in every possible case, sketches of apparatus used. Oftentimes carefully prepared sketches are much more valuable than notes, since one can often write something that while not wrong does not tell all the truth, but in making sketches lines will not go together properly unless accurate seeing has preceded. Both notes and sketches should be brief but accurate.

The general plan of work that is here presented has been used with variations for three years. Further experience will doubtless necessitate other changes. The topics that have received major attention in one year have not always been the ones to receive such attention the next year. During the past year the teaching in these grades of the Elementary School of the School of Education was done largely by Mr. H. R. Halsey.

The following outlines are partly the outcome of Mr. Halsey's experience, and partly the outcome of observation and experience of others in the same and preceding years.

SEVENTH GRADE

The general topics used in the seventh grade include an elementary study of the meaning of chlorophyll to plants; the nature of different soils in their relation to plant life; some of the processes by means of which a plant lives—root and leaf absorption, conduction through the stem, evaporation and transpiration, and the elementary chemistry of food-manufacture by means of chlorophyll; surplus food, food-storage and its sig-

nificance to other living things; the special growth and food-storage habits of man's domestic plants; the history of domestication of domesticated plants and animals, and the present methods of their improvement through cultivation, transplantation, and breeding. A study is made of the forms of energy that are used in the industries with electricity as a type; an experimental study of electricity and electrical apparatus; manufacture and use by pupils of simple electrical apparatus.

The work may begin by a study of the nature of a plant —its roots, stems, and leaves—or by a study of the leaf of a plant, or by use of plant-responses, as wilting, transpiration, root-pressure, or by a study of the soil in its relation to plant-activities. If we begin with the soil the first experiments to be performed are those with the structure and water-holding capacity of soils. Qualitative experiments with reasonable approximation of quantitative results are employed. One series of experiments relates to water-holding power and the other to water-lifting power. Secure a given quantity—e.g., one quart—each of sand, loam, and clay and weigh carefully. Place where they will dry rapidly, and weigh from day to day. (If artificial heat can be used in drying, more accurate results may be had in a short time.) Each pupil should note the amount of water evaporated from each kind of soil. In closing this experiment pour upon each kind of soil the amount of water that was found to be evaporated from it and observe the amount again absorbed and the relative rate of this absorption. After having prepared thoroughly dried samples of each kind of soil, place each in a glass tube that is at least an inch in diameter, tying cloth over one end to hold the soil. Stand the three tubes in a dish of water and determine the rate at which each lifts water. A similar set of tubes is used to investigate the rapidity with which water passes downward by pouring water into the tops of the tubes. The observations and inferences from these experiments demand careful observation and discussion and constant reference to the life of plants in these soils. Mixed soils and organic matter in the soils should receive attention, but to be studied in detail require too

prolonged work for pupils of this grade. Explanation of the significance of surface cultivation of soils both in garden and field as well as the significance of dry-land farming is based upon these experiments, and should be given in this connection.

How plants take up soil water and the things that are in solution in it cannot be answered fully by experiment at this time, but two or three simple experiments form the basis for interpretation of what is known of the process. First a stem and leaf lifting experiment (Fig. 1) is performed by cutting off, under water, the top of a potted plant. It should be cut so as to

Drawing by Amy Rachel Whittier

FIG. 1.—A simple device to test the power of a stem to lift water

leave about one and one-half inches of the stump. A relatively hard-stemmed plant, as the geranium, Indian corn, or a woody plant, is best. Then by handling the plant and tubing under water so as to avoid getting air into the plant or tubing, attach the stem by means of rubber tubing to one arm of a U-shaped glass tube, making certain that the glass and rubber tubes are entirely filled with water. The connection should be made air-tight by carefully tying the rubber-tube collar about the base of the stem and the top of the tube. Remove the plant and tube and support them carefully upon a ring-stand and observe whether the water in the tube disappears. Secondly, attach in the same way to the stump of the plant, not necessarily under water, a straight piece of tubing (Fig. 2), keep the roots watered, and note results. By means of these experiments it will be

found that roots force water upward and that leaves and stems lift water.

Several other demonstration experiments may be made. Chlorophyll may be dissolved from the leaf by alcohol. Chlorophyll containing cells of a leaf or of algae should be shown the class. Starch food may be demonstrated, if present, by use of an iodine test, first having treated ordinary starch with iodine to show the characteristic color reaction.

These experiments form the basis for a discussion of the work of chlorophyll. Pupils of this grade greatly enjoy learn-

Drawing by Amy Rachel Whittier

FIG. 2.—Apparatus for testing the ability of plant roots to force water upward

ing the simple chemistry that may be used in this connection. The chemical formulae for water, carbon dioxide, cane sugar or glucose, and starch are introduced. It is clearly stated that many intermediate chemical changes occur before sugar and starch are made, but that these are too difficult for our study. We deal with the initial materials and final results in order to make a basis for a general interpretation of the significance of plant work. Electrolysis and synthesis of water have twice been used as a demonstration of chemical change, and if the apparatus is set up before the class and the pupils are called upon to observe and explain phenomena, an intensely interesting exercise is had.

The relation of surplus food of plants to dependent plants (toad-stools and mushrooms, plant parasites, etc.), to animals,

and to the world's food supply in general is given brief attention. The book by Carpenter on *How the World Is Fed,* published by the American Book Company, offers valuable reading material upon this topic. This readily leads to a brief study of the history of domestication of plants and animals. It is not intended that this should be a study of the biological evolution of domesticated plants and animals, but a study of whence and how came these forms in man's experience with them. This study should be associated with an investigation of the regions and methods now employed in best production of domesticated plants and animals. Different aspects of this topic should be assigned to different pupils, making certain that there is available source material for each topic assigned. First in class discussion there is prepared a list of the most important domesticated animals and plants—horse, cow, pig, poultry, corn, wheat, potato, apple, tulip, rose, etc. (The fifth-grade course includes a study of the use of these to men, therefore that aspect may now be reviewed as a basis for further work.) The problem of ascertaining whence and how they came, where and how they are now being grown and improved, must be clearly defined. Then each pupil is assigned one topic, and each is given definite direction as to how he may begin his work. To most pupils should be handed but one or two references upon which they should report to the class. Some should write to experiment stations or commercial firms for their data. In some cases interesting work is done by having pupils correspond with pupils in regions where work upon some of these topics is going on. As in the case of the nature of the growing cotton plant, valuable co-operation with a southern schoolboy might readily be arranged and letters and samples of importance and interest thus secured.

If possible, schoolroom or garden experiments in cross pollination should be made, though with our facilities not much can be done. Experimental horticultural work in this connection would doubtless be highly valuable. In previous garden work, however, a study of pollination and seed-formation was made and the facts then gained are now used as a basis for an understanding of how cross breeding of plants is effected. Some of

the results of plant and animal breeding will have been developed in the special studies but the general topic should be discussed. One or two of the conspicuous triumphs of plant-breeders, such as in increasing the oil or starch content of corn and in production of hardy oranges, should be studied.

It is desirable that there be prepared for reading simple accounts of the domestication, present conditions, and methods of improvement of plants and animals of universal importance. Such accounts if made available would enhance the efficiency of this phase of elementary science.

The study of chlorophyll and its utilization of part of the sun's energy in food-making should in this grade be accompanied by a study of a form of energy which has wide mechanical possibilities and which offers opportunity for use of the pupil's inventiveness. For this the topic of electricity is used. It has seemed necessary to have most of the experiments performed before the class, these being performed by a group of pupils or by the teacher. Demand for explanations should always be preceded by an experiment or demonstration. There are few appliances so well known that their previously observed working can be recalled with sufficient accuracy to serve as a basis for discussion. Most of the children have access to some electrical apparatus at home, and several have purchased apparatus. Any who wish are allowed to go into the elementary-science room after school hours and try experiments, and several have often availed themselves of this opportunity.

Various initial experiments have been used with different classes. The study of magnets or of the dynamo offers excellent beginning topics. In the past year an explanation of electrical appliances was called for with the incandescent carbon-filament lamp as the first instrument that was used. Most of the class had handled the lamps and thought they could explain how they work. A few minutes occupied in attempts to explain, however, convinced the children that they needed to understand several things before they could give a satisfactory explanation. Electric bulbs were passed to the class and the plan of construction called for. The pupils were exacting in their demand for

clear explanations from one another and few statements were allowed to pass unchallenged. Experiments with the socket and use of the key were made at school and at home. Drawings illustrating the mechanism and the course of the electric current through the filament were finally made by the children and much interest was shown in explaining these drawings.

The arc lamp was next investigated and gave little difficulty, although there was needed help from the teacher in explaining the flow of current when the carbons were separated. The automatic regulating device was left until later when electromagnets were considered.

Magnets were next taken up. Different articles were tested for magnetism. Individual experiments were made with the usual compass and iron filings apparatus. Various magnets were tested to determine their polarity. A broken magnet compelled most of the children to rethink their conclusions already formed. An electromagnet was then examined and the relation of polarity and direction of current discussed. So far the current used had been taken from the light mains in the classroom. At this point experiments with batteries as sources of curents were taken up. The dry, Daniel, and storage forms were used. Each type was studied both from the point of what it does and of how it is made. Many of the pupils constructed wet cells of various types. Then followed applications of the electromagnet—the telegraph, electric bell, motor, dynamo, telephone, automatic clutch for the arc lamp, etc. In case of the first three the pupils were given the problem of devising a piece of apparatus to accomplish the end stated. The solution of the telegraph came promptly. The electric bell was more difficult. Plans were presented by means of board drawings, and criticisms from the class uncovered the faults until several quite different but acceptable plans were developed. Some of these were very original. The keen and pointed criticism of the class indicated insight into the factors involved (Plate I, Fig. 1).

Devising a motor was the most difficult problem. Some suggestions were given, but the keen interest of the boys especially served to bring out a large number of suggestions so that several

types of motors were planned. Finally a half-dozen different types of motors were brought into the class and studied. More than one-half the pupils bought the parts of the small Ajax motors and wound and assembled them, thus constructing working motors. A small hand dynamo was used in running the motors.

Some of the pupils suggested that a motor might run a dynamo which in turn might run the motor. This occasioned vigorous argument and presentation of evidence and the claim was of course disproven.

Telephones were brought into the room and studied, but not all the pupils got a good understanding of the instrument. Different types of lamps were used—the mercury lamp (for which an original plan for an automatic tilting device was devised by one of the boys), the Tungsten, Nernst, and flaming arc, and their cost of operation was compared with that of the carbon-filament lamp. This work of course involved calculations and the use of the units, ampere, volt, and watt, in which the pupils took great interest. Numerous problems involving cost of currents for various instruments were given and solved with readiness and accuracy.

The wireless telegraph appealed to some of the boys more than did any topic. Two weeks were spent on the instrument, at the end of which time at least a dozen boys had outfits in operation at their homes. Some succeeded in passing and receiving messages over a distance of two miles. Higgins' *Elementary Science*, published by Ginn & Company, contains many valuable suggestions for the elementary physics of the seventh and eighth grades.

EIGHTH GRADE

The topics in elementary science that have been found useful in this grade are: The phenomena of boiling, condensation, the distillation of water, expansion and contraction; steam and its uses; heat energy, the sources from which, in the industries, heat is derived; manufacture of gas from coal, wood, paper, etc.; combustion and oxidation (rusting); temperature measure-

PLATE I

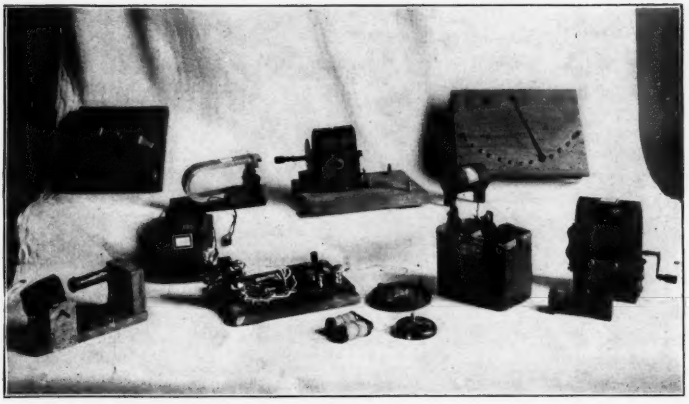
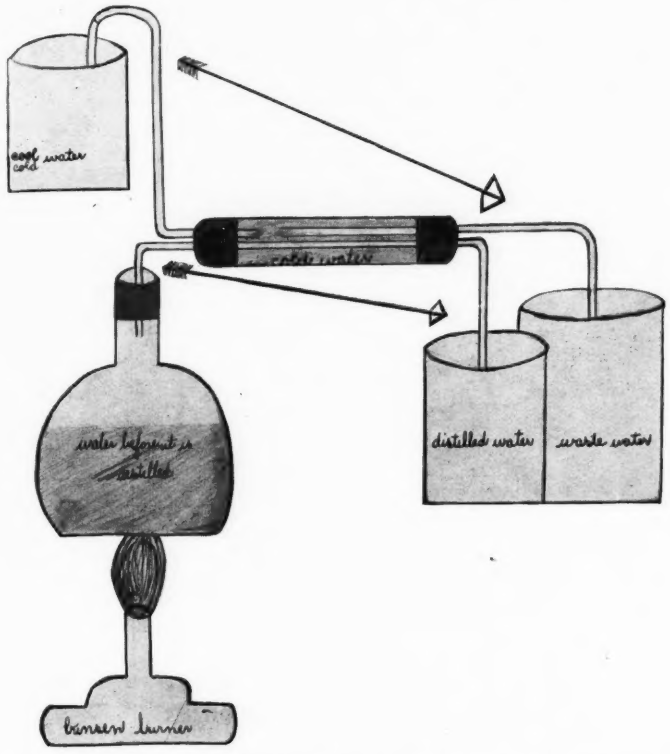


FIG. 1.—ELECTRICAL APPARATUS MADE BY PUPILS IN THE SEVENTH GRADE

FIG. 2—EIGHTH-GRADE BOYS CONSTRUCTING APPARATUS WITH WHICH TO DISTILL WATER

The apparatus is in focus which throws the pupils slightly out of focus

PLATE II



A Boy's Diagram of His Distilling Device, Made After the Apparatus Was Constructed

This is one of the best of the diagrams received in this work. Below is a copy of a calculation that was made and turned in as part of the report of one pupil. The part of the report given is only that which relates to the use of the apparatus in determining the cost of using the pupil's apparatus:

I burn gas at the rate of 1 cent every 2 hours. I distill 4 oz. every 15 minutes or 1 pint every hour, or a quart every 2 hours, therefore costing 1 cent a quart.

Distill 4 oz. in 15 minutes.
16 oz. or 1 quart in 60 minutes.
1 quart in 2 hours.
1 gallon in 8 hours.

It cost 1 cent every 2 hours. Then it cost 1 cent for every distilled quart, or it cost 4 cents for every distilled gallon.

Hydrox costing $0.10 per gallon.
My way costing $0.04 per gallon.
I make $0.06 per gallon.

ments and construction of thermometers. The atmosphere, its elementary physical and meteorological phenomena; precipitation; the barometer; wind energy; pumps; light, its relation to food and energy of the world as already shown in chlorophyll work, and some of its phenomena and reactions as shown in a study of photography. The elementary science of some of the materials of the industries, as fibers, paper, glass, rubber, paint, etc. An elementary study of forests and forest influences upon soils, waters, climate, health, animal and plant life; the timber industries (topic opened in the fifth grade), the regions of the world's leading forests, methods and reasons for extending forests.

The study of heat may well begin either with an experiment in boiling or one in expansion of solids. In the first case a tea-kettle and an open pan operated in boiling water before the entire class afford excellent beginnings. In expansion of solids the ball and ring experiment is good. In studying the phenomena of boiling it is best to use a standard thermometer, simply stating in case questions arise that later the working of the instrument will be considered. It is helpful, however, to record temperatures of water in different stages of experiments. First boil the water in the tea-kettle and secure as complete observation and interpretation as the pupils can make. Close the spout of the tea-kettle and repeat the experiment. In the open pan slowly bring the water to the boiling point and ask pupils particularly to study the occurrences at the surface of the water. Accompany these observations with an experiment in weighing a pan of water before and after boiling. By collecting steam in a cold tube and noting the resulting condensation of water the problem of distillation is introduced. Plans for the manufacture of a miniature still from common laboratory materials are called for. Drawings of proposed plans have been required in some cases before experimentation and in some cases after building an apparatus (Plate I, Fig. 2). Better thinking and more efficient experiments seemed to come from first devising a plan on paper, although in amost every case the plans had to be changed before a working apparatus could be

built. Some of the stills were built so well that it was possible to distill water and by means of a gas meter to determine the cost of distillation by means of this apparatus (Plate II).

During the past year instead of experiments in distillation more attention was given to the use of steam engines. Most of the pupils knew a little about engines, but rational explanations were absent. The cylinder and piston of a steam pump were first assigned and were readily explained. The stride valve, thus making locomotion possible, was added by several who doubtless had numerous observations from which to draw. Models and drawings were then placed before the class. A large model of the chest valve, valve cylinder, and revolving mechanism was borrowed and proved of much interest and value. The construction of the boiler was explained and discussed in its relation to the other parts of the engine. Pupils then made drawings illustrating the construction and action of various parts of the steam engine, and carefully written statements in explanation were prepared. In connection with the experiments made by one class upon distillation, the construction of thermometers was taken up. The principles involved and methods of gradation were discussed and different types of thermometers were constructed. Some of these were graded in the Fahrenheit system, some in Centigrade, and some in systems devised by the pupil. In all cases the pupils transferred the value of units in their readings into terms of other units. The accuracy with which these thermometers were made is shown by the fact that although some of the thermometers were several degrees away from standard readings the average taken from all the instruments made by the class was less than one degree from the standard reading.

In the manufacture of gas from various substances further illustration is had of the method of study. Ordinary clay pipes were filled, some with soft coal, some with wood, and some with paper. The bowls of the pipes were cemented with ordinary cement or with potter's clay. When dry these were fastened upon ring stands and the bowls slowly heated by a gas flame. From some of the pipe stems there soon appeared a jet of smoky

gas. To this a lighted match was applied, when it began to burn. If the flame under the bowl is removed the gas soon ceases to be formed, and if reapplied it begins again and continues until the gas-forming properties of the material are exhausted. The pipe bowls are then opened and the charred contents examined. An explanation of these materials and occurrences is thought-stimulating and provides a basis for an understanding of other gas-forming materials and processes.

The nature of combustion and oxidation follows. During the past year three weeks were given to laboratory work with oxygen, the meaning of oxidation, and methods of aiding and preventing it. Carbon dioxide followed and as in the case of oxygen was studied in experiment and in discussion of the place of this gas in nature and industry. There are taken up various experiments with the atmosphere relating to its reality, weight, pressure, expansion, and contraction, pumps, water-carrying power, and currents. Previous work in geographic aspects of the atmosphere is called for. The construction and reading of weather maps are studied. As suggested above, photography is used as a means of studying light, this topic also receiving more time during the past year than previously. Some general discussion of photography leads to the pinhole-camera experiment. Each pupil constructed a pinhole camera, securing therefor a starch box or a similar box. The nature of light action through prisms and through lenses was discussed. The action of light upon a sensitized emulsion and the mechanical and chemical processes involved in developing and printing were discussed. Each pupil took a picture and carried it through each requisite process to the final print. Most of the pinhole cameras leaked light, but a few good pictures were secured. Several of the pupils secured notions of the fundamentals involved in photography which, in addition to being instructive, will in the use of their own cameras prove useful to them.

A list of the important industries in and about Chicago is prepared by the class, and each pupil or group of pupils is assigned one industry and is asked to prepare a brief report concerning the raw materials used, the processes and machinery

involved, and the final and by-products made in the industry. The lumber industry is omitted from these assignments and is made the topic for a more extensive study. Five weeks were spent last year in a study of elementary forestry in this country and in Europe. A review of local native trees, and of local lumber supplies (discussed in geography course), and of how a tree grows, is followed by assignment of readings from pamphlets and library books. Much of the study must be entirely classroom work contributed largely by the teacher, since experience of pupils and reading material for pupils of this age are not abundant. There are, however, available discussions of forest needs and influences, photographs, and descriptions of what is being done in various parts of the country in forest extension and in withstanding forest enemies. Forest fires, predatory insects, and unnecessary commercial destruction are of interest to all. *The Primer of Forestry,* by Gifford Pinchot, U.S. Department of Agriculture, is valuable for this work. The U.S. Forest Service also publish a list, in a bulletin which cites many available helps in such work. And *Care of Trees,* by B. E. Fernow, published by Henry Holt & Co., 1910, is full of authentic practical suggestions.

A COMPARATIVE STUDY OF THE GRADES OF PUPILS FROM DIFFERENT ELEMENTARY SCHOOLS IN THE SUBJECTS OF THE FIRST YEAR IN HIGH SCHOOL

FRANKLIN W. JOHNSON
Principal of the University High School, Chicago, Illinois

[EDITORIAL NOTE.—The editors of this *Journal* are the officers of the Elementary School of the University of Chicago. They present with very great satisfaction the following article as a full, concrete illustration of the application of impersonal scientific methods to elementary-school problems. In the near future other studies of larger school systems will be presented, and it is hoped that the significance of this method will be widely recognized. If studies of this type could be made in every school system, supervision and administration of schools would rise to a level never attained in any educational system.

Attention is not unlikely to be drawn to those parts of the report which seem to show defects in the work of the University Elementary School. In later years similar reports will be made, and it is hoped that concrete evidence can then be presented of the advantages of knowing one's own weaker points. This study is the basis of the present administration of the school. The officers of the school are clear also that their problem is not merely to prepare for high school. The Elementary School does many types of work not touched on in this report. The aim of the school, however, is to do the conventional types of work in such a way as to achieve equal efficiency with other schools and at the same time to work out problems not taken up by these other schools.

Finally, the significance of these results will not be fully appreciated by any reader who fails to recognize that the high school is studied by these tables quite as much as the elementary school. Is the relation here discovered in history due to the training in the elementary school or to the methods employed in the high school? The practical answer to this question is to be found in the fact that the history instructors in these two schools have been organized since the preparation of these tables into a single department. They have their problem set before them in impersonal and yet very emphatic form.—THE EDITORS.]

This study was undertaken for the purpose of testing the efficiency of the University Elementary School on the basis of the grades received in the first year of the University High

School. The pupils under consideration entered the High School in the autumn of 1909. The class contained 128 members of whom 44 came from the University Elementary School and 84 from other elementary schools, these being with a few exceptions the public schools of the city of Chicago.

In Diagrams 1–7, representing the grades of the Autumn Quarter, each number represents the same pupil throughout, those from the University Elementary School being indicated by bold-faced type (e.g., **19**), all other pupils by numbers in plain roman (e.g., 30). The numbers were assigned without reference to the schools from which the pupils came in the order in which the names occurred in the class lists of the various classes in English in the Autumn Quarter. The grades in the University High School are reported by teachers in multiples of five, passing grades ranging from 60 to 100. In the diagrams the grades are given at the bottom and the numbers in each column represent the pupils receiving these grades. For the purpose of comparison each diagram is divided into quintiles or groups comprising one-fifth of the class. The method adopted for the division into quintiles places in the lower quintile those pupils at the top of the column necessary to fill out the number. It will be noted that in the diagram for the Autumn Quarter in English this method happens to place an undue number of pupils from the University Elementary School in the two lowest quintiles and removes from the highest quintile to the next lower all the elementary-school pupils who received a grade of 75. The comparative standing in English of the pupils of the University Elementary School for the Autumn Quarter is thus less favorable than it should properly be and the standing in this subject is made somewhat less favorable for the entire year. An equitable redistribution would change the result as indicated in the broken line in Diagram 8. Chance seems to have played no similar part in any other portion of the comparison.

The diagrams are of interest not only because they exhibit the relation of pupils from the Elementary School to others, but also because of the light which they throw on the practices of different departments in the High School. Thus it will be

seen at once that the English department differs radically from the Latin Department in its use of the higher marks. The Science Departments distribute their students in a manner altogether different from the English Department.

Furthermore the diagrams make it possible to trace the individual variations of each pupil. Thus pupil number one stands in the highest quintile in English, Latin, Mathematics, and Design, but takes his place in the third quintile in French and German. Pupil number 2 stands in the highest quintile in all subjects which he takes. Number 5 stands well in English, Mathematics, and History, fair in Latin and Design, and far down the scale in Science. Number 102 shows the widest single variation, standing low in all subjects except Mathematics, in which he is one of the three to receive the highest grade.

DIAGRAMS 1–7

UNIVERSITY HIGH SCHOOL

Freshman Class, 128 pupils, *Autumn Quarter*, 1909

DIAGRAM 1.—ENGLISH

	118	110		47 **46**				
	117	108		45		128 pupils		
	116	**88**		**44**		1st Quintile 26		
	115	**87**		**43**		2d " 26		
	113	**86**		**42**		3d " 26		
	112	**85**		**41**		4th " 25		
	111	**84**		**40**		5th " 25		
	109	**83**	**65**	**39**				
	107	**82**	**64**	**38**				
	106	81	**63**	**37**				
130	103	**80**	62	**36**				
129	**102**	**79**	61	**35**				
128	**101**	**78**	60	34				
127	**100**	77	59	33				
126	99	76	58	32				
125	98	75	57	30				
124	97	74	56	29	20	**11**		
123	96	73	55	28	**19**	**10**		
122	95	72	54	27	18	**9**		
121	94	71	53	26	17	**8**		
120	93	**70**	52	25	16	7		
119	92	69	51	24	15	5		
114	91	**68**	50	23	14	4		
105	90	67	49	22	13	3		
104	89	66	48	21	12	2	**1**	
Fail.	60	65	70	75	80	85	90	95

DIAGRAM 2.—LATIN

101 pupils

1st Quintile 21
2d " 20
3d " 20
4th " 20
5th " 20

130							**87**	
129							81	
128						119	**64**	
125						**100**		
124			110			95	**40**	
123			109			**86**	**39**	
121			106		**101**	**82**	**38**	
117		120	96	**127**	90	72	**37**	
114	126	**112**	**85**	**116**	**83**	**63**	20	47
99	**118**	**102**	77	**113**	**79**	49	**19**	**44**
84	**115**	97	61	107	62	**46**	18	**42**
66	103	91	59	98	55	**41**	13	12
60	75	**88**	56	53	54	**36**	**11**	**10**
51	73	**78**	50	28	**43**	23	**8**	**9**
48	**65**	30	32	17	**35**	15	7	4
3	58	26	25	14	33	5	**1**	2
Fail.	60	65	70	75	80	85	90	95

DIAGRAM 3.—MATHEMATICS

127 pupils

1st Quintile 26
2d " 26
3d " 25
4th " 25
5th " 25

				126				
				110				
				103				
				100	**101**			
	128			91	93			
	127			90	71			
	122		**116**	76	**68**			
	113	124	**112**	67	59			
130	109	120	**111**	**63**	45			
129	107	119	95	55	**43**			
125	106	114	**85**	51	**40**			
123	104	108	**83**	48	**39**			
121	97	105	74	**41**	**36**			
117	**88**	94	73	**38**	32			
115	**82**	92	72	**35**	30			
99	**80**	89	61	27	28		**118**	
98	**79**	**78**	58	25	23		**64**	
96	77	62	56	24	15	**87**	53	
81	**70**	57	**37**	22	**11**	**86**	**44**	
75	69	54	18	21	**10**	60	**42**	
65	66	52	16	20	7	**46**	**19**	**102**
34	17	50	14	13	5	33	4	47
29	**9**	49	**8**	12	3	26	**1**	2
Fail.	60	65	70	75	80	85	90	95

DIAGRAM 4.—SCIENCE

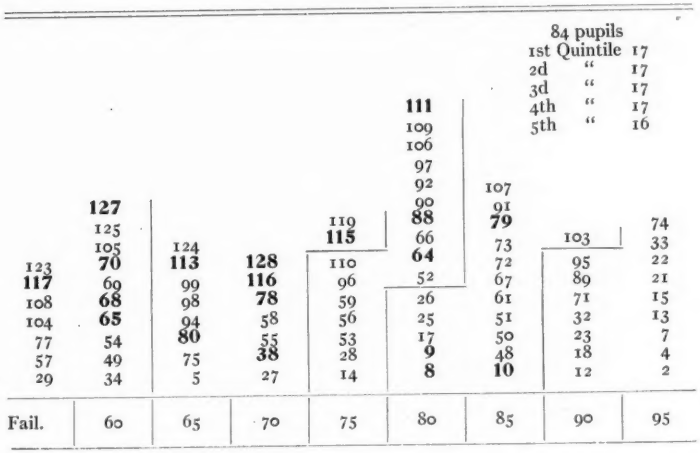


DIAGRAM 5.—HISTORY

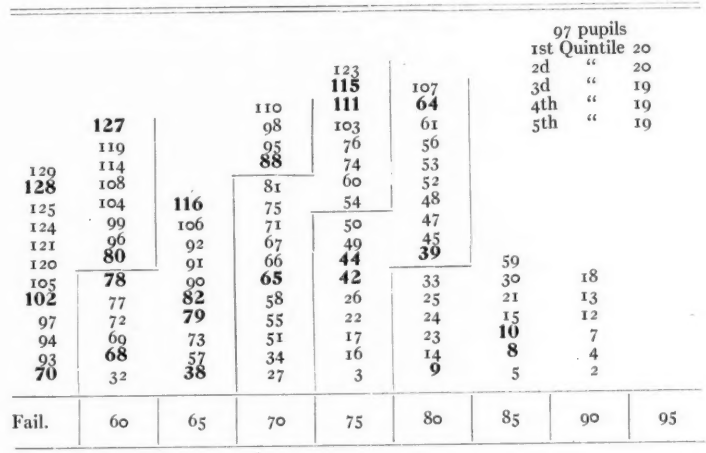


DIAGRAM 6.—FRENCH AND GERMAN

38 pupils
1st Quintile 8
2d " 8
3d " 8
4th " 7
5th " 7

122			**111**					
112			**101**					
			100	74				
			85	**70**				
			83	67	**87**			
			68	**63**	**43**	76		
	94	**118**	62	**41**	**40**	**46**		
108	89	**102**	**42**	**36**	**39**	45	**86**	
80	22	24	**1**	20	**35**	**11**	**19**	21
Fail.	60	65	70	75	80	85	90	95

DIAGRAM 7.—DESIGN

119 pupils
1st Quintile 24
2d " 24
3d " 24
4th " 24
5th " 23

				129				
				125				
				122				
				109				
				108				
				107				
				106				
			124	104	**127**	**128**		
			123	103	**118**	**115**		
			121	99	**117**	**113**		
			120	94	**116**	**111**		
			105	92	**112**	**85**		
			96	**88**	110	75		
			91	**83**	**101**	73		
			89	**79**	97	**65**		
			81	**70**	95	61		
			80	69	**64**	58	**100**	
			78	**68**	60	56	98	
			76	**63**	59	47	**87**	
			74	57	55	45	**84**	
			66	50	**46**	**40**	72	
			62	**43**	**37**	**35**	71	
			53	**38**	20	22	51	
			49	**36**	18	16	30	
			44	34	14	15	29	
		119	**41**	26	**11**	12	28	
		82	32	21	**10**	7	27	**86**
130	**102**	48	23	**19**	**9**	3	25	33
77	**8**	**42**	17	13	5	**1**	4	2
Fail.	60	65	70	75	80	85	90	95

Turning from these considerations to the main problem of comparison it is obvious that if the pupils from the Elementary School were in all respects like those from other schools a certain percentage of them should be distributed through each quintile in each of the subjects. Thus since there are 128 taking English and 44 of them come from the Elementary School, we might expect 34.4 per cent of each quintile to be from the Elementary School. Table I shows in detail how far the facts depart from this expectation. In the first column of figures at the left of Table I is recorded the total registration in each subject. In the second column the number of pupils from the Elementary School is recorded. In the third column is shown the percentage of University Elementary School pupils in each subject; in the other columns appear the percentage of University Elementary School pupils in each quintile and the variations in each subject from the normal or expected percentage. In the first and second quintiles an excess (+) represents an unfavorable showing for the University Elementary School, while a deficiency (—) represents a corresponding favorable showing; in the fourth and fifth quintiles an excess represents a favorable and a deficiency an unfavorable showing.

Tables II, III, and IV set forth similarly the facts for the Winter and Spring Quarters and for the entire year.

The matter can be exhibited graphically on the basis of Table IV by means of Diagrams 8–14. In each of these diagrams the horizonal line marked "0" indicates the level at which the Elementary School representatives should stand. The position which they take in each quintile is shown by the curve which crosses this horizontal line. Thus in Latin the real distribution is below the normal line for the three lowest quintiles and above for the two highest. By way of contrast the History curve is above the normal in the lowest quintile and below in all others.

From Diagrams 8-14 it appears that the pupils of the University Elementary School are greatly superior in Latin, Mathematics, French and German, and Design; in English they are somewhat inferior but stand in large proportion in mediocre

TABLE I

EXCESS OR DEFICIENCY IN GRADES OF UNIVERSITY ELEMENTARY SCHOOL PUPILS IN EACH QUINTILE FOR THE AUTUMN QUARTER

SUBJECT	NUMBER PUPILS	NUMBER U. ELE. SCHOOL PUPILS	PERCENTAGE U. ELE. SCHOOL PUPILS	1ST OR LOWEST QUINTILE		2D QUINTILE		3D QUINTILE		4TH QUINTILE		5TH OR HIGHEST QUINTILE	
				Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal
English	128	44	34.4	34.6	+ 0.2	46.2	+11.8	23.1	−11.3	44.0	+ 9.6	24.0	−10.4
Latin	101	40	39.6	23.8	−15.8	30.0	− 9.6	30.0	− 9.6	55.0	+15.4	60.0	+20.4
Mathematics	127	43	33.9	30.8	− 3.1	26.9	− 7.0	28.0	− 5.9	36.0	+ 2.1	48.0	+14.1
Science	84	19	22.6	29.4	+ 6.8	41.2	+18.6	17.7	− 4.9	23.5	+ 0.9	0.0	−22.6
History	97	22	22.7	25.0	+ 2.3	35.0	+12.3	15.8	− 6.9	21.1	− 1.6	15.8	− 6.9
French and German	38	24	63.2	37.5	−25.7	87.5	+24.3	50.0	−13.2	85.7	+22.5	57.1	− 6.1
Design	119	43	36.1	25.0	−11.1	29.2	− 6.9	50.0	+13.9	54.2	+18.1	21.7	−14.4
Total	**694**	**235**	**33.9**	**28.9**	**− 5.0**	**37.6**	**+ 3.7**	**29.5**	**− 4.4**	**42.3**	**+ 8.4**	**31.1**	**− 2.8**

TABLE II

EXCESS OR DEFICIENCY IN GRADES OF UNIVERSITY ELEMENTARY SCHOOL PUPILS IN EACH QUINTILE FOR THE WINTER QUARTER

SUBJECT	NUMBER PUPILS	NUMBER U. ELE. SCHOOL PUPILS	PERCENTAGE U. ELE. SCHOOL PUPILS	1ST QUINTILE		2D QUINTILE		3D QUINTILE		4TH QUINTILE		5TH QUINTILE	
				Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal
English	108	42	38.9	50.0	+11.1	45.5	+ 6.6	22.7	−16.2	38.1	− 0.8	38.1	− 0.8
Latin	74	33	44.6	33.3	−11.3	53.3	+ 8.7	26.7	−17.9	60.0	+15.4	50.0	+ 5.4
Mathematics	105	39	37.1	28.6	− 8.5	28.6	− 8.5	42.9	+ 5.8	28.6	− 8.5	57.1	+20.0
Science	75	18	24.0	33.3	+ 9.3	33.3	+ 9.3	13.3	−10.7	26.7	+ 2.7	13.3	−10.7
History	80	19	23.8	43.8	+20.0	12.5	−11.3	25.0	+ 1.2	25.0	+ 1.2	12.5	−11.3
French and German	32	21	65.6	85.7	+20.1	14.3	−51.3	100.0	+34.4	50.0	−15.6	83.3	+17.7
Design	104	43	41.3	23.8	−17.5	42.9	+ 1.6	47.6	+ 6.3	61.9	+20.6	30.0	−11.3
Total	578	215	37.2	38.5	+ 1.3	35.0	− 2.2	34.5	− 2.7	40.9	+ 3.7	37.2	0.0

TABLE III

EXCESS OR DEFICIENCY IN GRADES OF UNIVERSITY ELEMENTARY SCHOOL PUPILS IN EACH QUINTILE FOR THE SPRING QUARTER

SUBJECT	NUMBER PUPILS	NUMBER U. ELE. SCHOOL PUPILS	PERCENTAGE U. ELE. SCHOOL PUPILS	1ST QUINTILE		2D QUINTILE		3D QUINTILE		4TH QUINTILE		5TH QUINTILE	
				Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal
English	106	42	39.6	50.0	+10.4	28.6	−11.0	33.3	− 6.3	38.1	− 1.5	42.9	+ 3.3
Latin	63	34	53.9	76.9	+23.0	46.2	− 7.7	38.5	−15.4	58.3	+ 4.4	50.0	− 3.9
Mathematics	91	37	40.7	42.1	+ 1.4	33.3	− 7.4	22.2	−18.5	50.0	+ 9.3	55.6	+14.9
Science	66	14	21.2	21.4	+ 0.2	15.4	− 5.8	30.8	+ 9.6	23.1	+ 1.9	15.4	− 5.8
History	71	17	23.9	46.7	+22.8	14.3	− 9.6	28.6	+ 4.7	14.3	− 9.6	14.3	− 9.6
French and German	30	20	66.7	66.7	0.0	50.0	−16.7	66.7	0.0	66.7	0.0	83.3	+16.6
Design	105	41	39.0	19.0	−20.0	28.6	−10.4	52.4	+13.4	33.3	− 5.7	61.9	+22.9
Total	**532**	**205**	**38.7**	**42.7**	**+ 4.0**	**30.2**	**− 8.5**	**36.8**	**− 1.9**	**38.1**	**− 0.6**	**44.8**	**+ 6.1**

TABLE IV

EXCESS OR DEFICIENCY IN GRADES OF UNIVERSITY ELEMENTARY SCHOOL PUPILS IN EACH QUINTILE FOR THE ENTIRE YEAR

SUBJECT	NUMBER PUPILS	NUMBER U. ELE. SCHOOL PUPILS	PERCENTAGE U. ELE. SCHOOL PUPILS	1ST QUINTILE		2D QUINTILE		3D QUINTILE		4TH QUINTILE		5TH QUINTILE	
				Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal	Percentage U. Ele. School Pupils	Variation from Normal
English	342	128	37.4	44.3	+ 6.9	40.6	+ 3.2	26.1	−11.3	40.3	+ 2.9	34.3	− 3.1
Latin	238	107	45.0	40.8	− 4.2	41.7	− 3.3	31.3	−13.7	57.4	+12.4	54.3	+ 9.3
Mathematics	323	119	36.8	33.3	− 3.5	29.2	− 7.6	31.3	− 5.5	37.5	− 0.7	53.1	+16.3
Science	225	51	22.7	28.3	+ 5.6	31.1	+ 8.4	20.0	− 2.7	24.4	+ 1.7	9.1	−13.6
History	248	58	23.4	37.3	+13.9	22.2	− 1.2	22.4	− 1.0	20.4	− 3.0	14.3	− 9.1
French and German	100	65	65.0	61.9	− 3.1	52.4	−12.6	70.0	+ 5.0	68.4	+ 3.4	73.7	+ 8.7
Design	328	127	38.7	22.7	−16.0	33.3	− 5.4	50.0	+11.3	50.0	+11.3	37.5	− 1.2
Total	1,804	655	36.3	36.0	− 0.2	34.6	− 1.7	33.2	− 3.1	40.6	+ 4.3	37.1	+0.8

position; while in History and Science they are decidedly inferior. The inferiority in English is partially accounted for by the chance grouping in the Autumn Quarter referred to above. An equitable distribution gives the results indicated in the broken line in Diagram 8, showing that there is but a slight inferiority. For the inferiority in Science and History

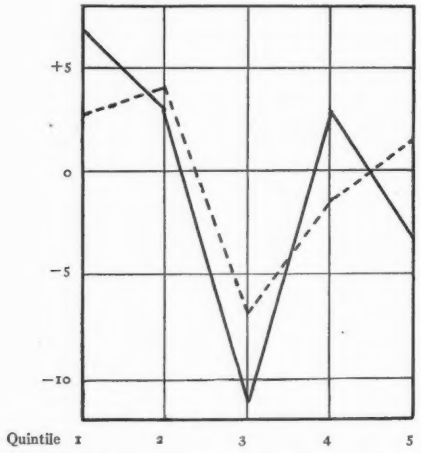


DIAGRAM 8.—Excess and deficiency in grades in English of pupils of Universit Elementary School. (Broken line shows correction in Autumn Quarter.)

another explanation must be sought. This may be found, in part at least, in the fact that 16 pupils of the University Elementary School omit History and Science and take French and German in their place. A comparison of the standing of these pupils with the 28 others from the school indicates that the work of those not taking History and Science is in general of very much superior grade. Table 5 and Diagram 14 exhibit this fact. This table is exhibited graphically in Diagram 14.

The problems which are suggested by this study are numerous. It is not the purpose of this report to enter into detailed discussion of these problems. The paper is offered rather as an exhibition of the kind of study which should in every case accompany supervisory inspection. How one department com-

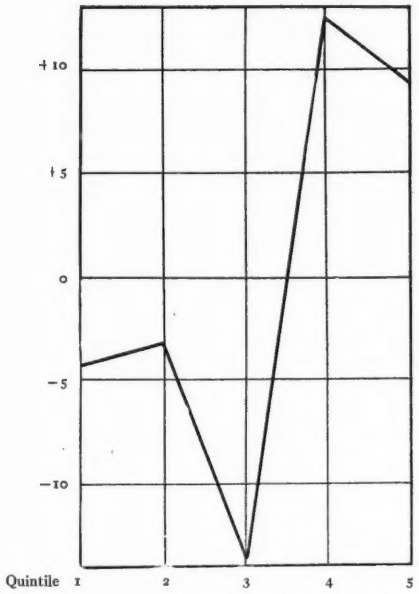


DIAGRAM 9.—Excess and deficiency in grades in Latin of pupils of the University Elementary School.

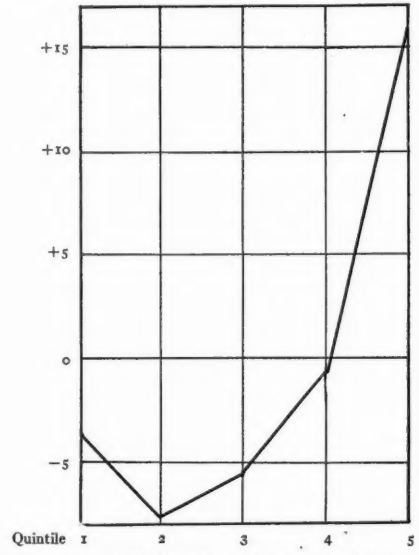


DIAGRAM 10.—Excess and deficiency in grades in Mathematics of pupils of the University Elementary School.

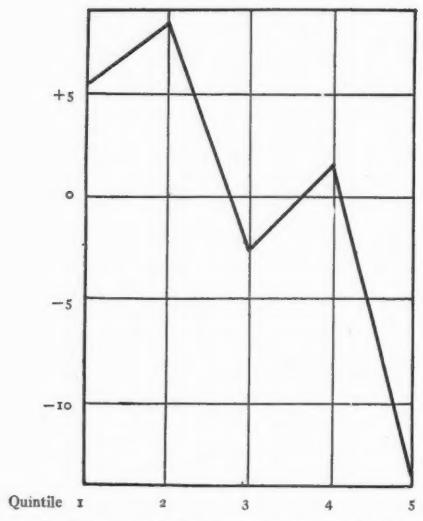


DIAGRAM 11.—Excess and deficiency in grades in Science of pupils of the University Elementary School.

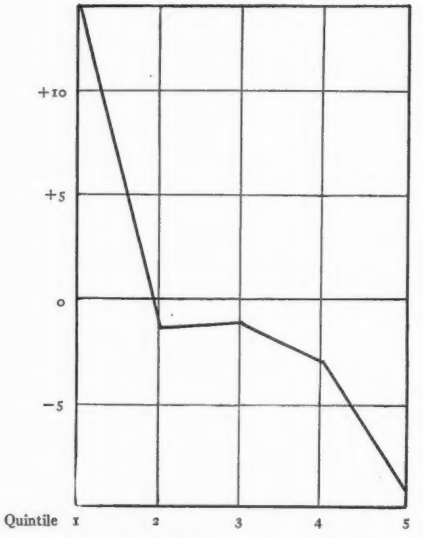


DIAGRAM 12.—Excess and deficiency in grades in History of pupils of the University Elementary School.

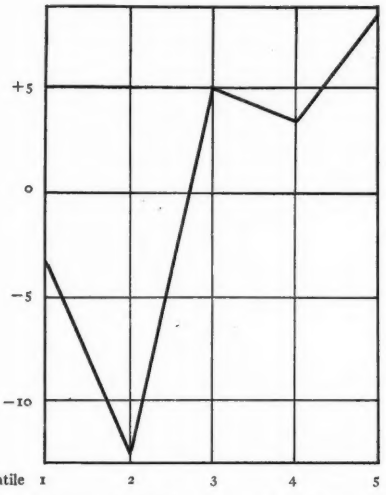


DIAGRAM 13.—Excess and deficiency in grades in French and German of pupils of the University Elementary School.

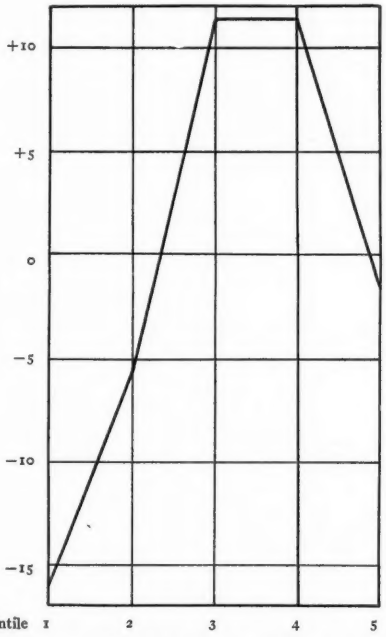


DIAGRAM 14.—Excess and deficiency in grades in Design of pupils of the University Elementary School.

pares with another, how one school compares with another, and ultimately how one teacher compares with another can be discovered by minute and exact comparisons of the products.

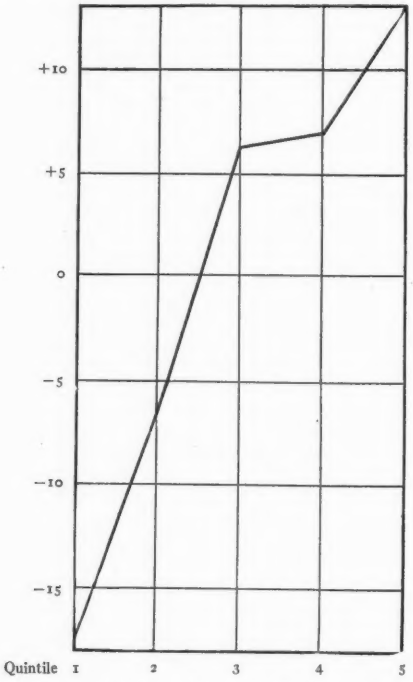


DIAGRAM 15.—Excess and deficiency in grades of pupils from the University Elementary School not taking Science and History compared with grades of other pupils from school.

TABLE V

COMPARISON OF THE GRADES OF THE 16 UNIVERSITY ELEMENTARY SCHOOL PUPILS NOT TAKING SCIENCE AND HISTORY WITH THOSE OF THE OTHER 28 FROM THE SAME SCHOOL

Total Number of Grades U. E. S.	Number Grades of 16	Percentage of Grades of 16	1st Quintile		2d Quintile		3d Quintile		4th Quintile		5th Quintile	
			Percentage of 16	Variation	Percentage of 16	Variation	Percentage of 16	Variation	Percentage of 16	Variation	Percentage of 16	Variation
481....	189	39.3	21.8	−17.5	33.0	−6.3	45.4	+6.1	46.2	+6.9	52.2	+12.9

AGRICULTURAL EDUCATION: PERIODICAL LITERATURE[1]

BENJAMIN MARSHALL DAVIS
Miami University

Popular periodicals have become an important factor in education. They reach thousands of people. Several have a circulation of more than 100,000, and a few claim to reach a million readers. Every subject of popular interest is exploited. This popular interest determines in a large measure the choice of subject-matter, but not always. Interest in new things is often stimulated by well-written articles. Indeed there is a keen search for new things or the beginnings of new movements that may seem to have elements of popular interest. The importance of rural education, the inefficiency of the present system, and the need of redirecting rural education are new things from the standpoint of the popular periodical.

An educational system which originated in pioneer days, and which served its purpose well in those days, persists today with less modification than has taken place in any other feature of rural life. The few changes that have taken place were brought about largely through imitation, either voluntarily or impressed by law, of urban schools, and were not the changes of an adaptive growth. This static condition of rural education until a few years ago, and in most communities at the present time, was looked upon with complacency and satisfaction. Patrons who were not satisfied quietly moved to some town or city where their children might have better educational advantages, but little or no criticism of the rural school was ventured and little or no effort made to improve it.

With this situation in mind, it is easy to see why any departure from the established routine in rural-school manage-

[1] A discussion of "Agricultural Education in Educational Periodicals" appeared as the preceding article of this series, in this magazine, September, 1910.

ment or any effort to make its work better adapted to rural conditions would be regarded by editors of popular periodicals as something new and worthy of wide publicity.

Consolidation of rural schools began in the early nineties. Various periodicals gave accounts of the schools of Kingsville Township, Ohio, which in 1892 instituted a plan of consolidation for rural schools. This movement soon attracted much attention, and many visits were made to Ohio for the purpose of seeing the plan in actual operation. In a few years the plan was not only extended to other parts of Ohio but was introduced in many other states. It has worked so successfully as to be considered one of the most important features of any general scheme for improving rural schools.

The work of Kingsville Township was not the historical beginning of the consolidated-school movement, but it was the potential beginning, largely due to the public notice it received through newspapers and periodicals.

Superintendent O. J. Kern, of Winnebago County, Ill., had barely demonstrated the success of his Farmer Boys' Experiment Club which he had organized in February, 1902, among the schoolboys of his county, when he was asked to give an account of it in one of our leading popular magazines. This work of his was something new in a county system of schools, and furthermore it had begun at once to interest farmers and to change their attitude toward the rural schools. Winnebago County was a typical county with large agricultural interests. Its problems and interests were like those of hundreds of other counties. Superintendent Kern had found something that looked toward making the school life of the country boys more worth while, but he had much more in mind than his Boys' Experiment Club. He believed that the whole rural-school system needed readjustment and that it might be slowly brought about.

Here was a chance for the magazine to be of service by giving publicity to successful work, and for the writer to get others interested in his plans, and to get them to work along similar lines. The article appeared under the title of "Learning by Doing for the Farmer Boy" and was illustrated by five

good pictures with the "boy" prominently in the foreground of each. The title and the pictures were attractive and were likely to cause the reader to pause in turning through the pages of the magazine long enough at least to read the introductory paragraph. This was an expression of an ideal for rural education which up to that time (1903) had not come much into public notice:

> It is not the belief or wish of the writer that we should educate country boys to be farmers merely, any more than that we should educate boys to be blacksmiths, carpenters, or electricians. We should aim to train boys to be men in the highest sense of the term. But why not a course of training in the country school for the country boy which shall teach him more about country life around him? Along with his study of the kangaroo, the bamboo, and the cockatoo, why not study the animals on the farm and a proper feeding-standard for them, the care and composition of the soil on the farm, the improvement of types of grains and vegetables, and the protection of birds beneficial to the farmer? Instead of all the boys' arithmetic being devoted to problems, more or less theoretical, on banking, stocks, exchange, brokerage, alligation, and partnership, why not some practical problems with reference to farm economics? For the boys who will remain on the farm (and 85 per cent perhaps will) the course of instruction should be such as will be an inspiration and a help in their future life-work (84).[2]

A year later under the title of "Common-Sense Country Schools" a description of Mr. Kern's work appeared in another magazine (85). Other references to his work have been published from time to time.

Boys' clubs for carrying on agricultural experiments have been organized in all of the agricultural states. Accounts of their work are attractive reading, and no doubt not only stimulate the boys in other localities to form similar clubs but help to educate adult farmers to be more appreciative of expert opinion. But the most important contribution made by periodicals to agricultural education through boys' clubs has been in making the way easier for agricultural colleges and public-school officers to carry on the work in various parts of the country.

In the same number of the magazine in which Mr. Kern's article appeared is another dealing with the problem of rural

[2] The references are to the bibliography at the end of this article or to bibliographies in other articles of this series.

education (86). The need of a school system adapted to rural conditions is set forth. Special emphasis is placed upon the value of agricultural high schools and of consolidated rural schools. At that time there were twelve agricultural high schools in the United States. There are now seventy-five.

Another account of important work in agricultural education was published in the same year (1903) with the title "Teaching Farmers' Children on the Ground" (87). It is of interest to compare the opinion of Superintendent Kern as to the needs of the rural school with that of the writer of this article who was not professionally engaged in education. The following is taken from his description of a rural school:

> But there is more the matter with the ordinary country school than its smallness of scale. . . . . Yet that these children come from homes where the livelihood is earned out of the ground is ignored in the lessons. The instruction as far as it goes is good: it is staple reading, writing, and arithmetic, with a little grammar, geography, and history. This is all. It might do well enough if the boys and girls were all going to be clerks or traders; or if, in the fulness of their ambition, they were to strike out for professional careers. But of sowing and reaping there is never a word; nothing about planting and tending of trees, the production of milk, butter, and cheese. Never, even remotely, does a lesson touch on building and drainage, on the composition of foods or chemistry of fuel, or light up for so much as a moment the drama of struggle and survival of which every clover patch is a theater. It is well that children should learn at school useful lessons they can learn nowhere else, but should not the children of the farm be led to see somewhat of the inexhaustible scope for brains which offers itself to the farmer? The fact is, that rural instruction has been largely devised in cities with a view to city conditions. And the courses in city schools are faulty enough, ridden as they are by clerky traditions which permit the word to usurp the place of the act, instead of being merely its symbol and aid. The second evil in rural education throughout America is the stress laid upon verbal studies, the blinking the actual world of duty and joy for which country children should be informed and trained.

This is followed by a description of the proposed scheme for the improvement of rural education in Canada planned on a scale to include the whole Dominion. Not only is this description accurate but it includes a good historical and economic background. This account of the "Macdonald Movement"

before it was carried out in actual practice prepared the public mind for the numerous reports of the work that have appeared since.

Mention should be made of one more popular article on rural education appearing in 1903, entitled "Farmer Children Need Farmer Studies" (88). The title indicates the general nature of the discussion. That the writer is in full accord with the views already noted of other contributors is shown by the following statements:

> Our educational system has been made for city people, and the country school finds it second hand and ill-fitting and unattractive. To this fact more than any other, perhaps, is due the backwardness of education in agricultural states.

Quoted from a private letter:

> Statistics show that in this state each year sixty young men take up ministry, sixty-six law, and seventy-two medicine, while 13,000 annually take up agriculture as a gainful pursuit. But our school books are written for the few not the many. . . . . At present the entire curriculum leads away from the farm. . . . . Pick up any high-grade arithmetic in use in the rural schools and you will find no lack of attention to banking and commissions and foreign exchange and commercial affairs generally. But agriculture arises to no such dignity—not even in schools that will find five times as many recruits for the farm as for the city. The same applies to other texts.

The typical examples above presented of popular periodical literature on rural education appeared in 1903. This year was chosen because it seemed to mark the beginning of a somewhat general public interest in the subject, and partly because most of the development of agricultural education in elementary and secondary schools has taken place since that time.

During the period from 1904 to the present the subject of rural education has continued to receive notice in popular periodicals (85, 89, 90, 91, 92). The public has been kept informed concerning various phases of its development, agricultural and other industrial work in schools receiving especial attention.

One magazine addressed the following question to a number of prominent educators: "What new subject or new method or new direction of effort or new tendency in educational work

is of most value and significance and now needs most emphasis and encouragement?" (93). Nineteen replies were received. As most of the writers were college presidents various college problems were mentioned as of greatest importance but no two proposed the same problem. The only subject that was mentioned by more than three was practical education, summed up as follows: Trade work in public schools; interest in rural schools; practical studies; agriculture for rural schools; reaching all the people; teaching every man his job.

A good account of the present status of agricultural education in elementary and secondary schools appeared under the title "Catching Them Young" (94). After describing some recent progress in farming methods the author adds:

> Of what value is this knowledge if the sons and daughters are to quit the farm, leaving corn-belt prosperity to the haphazard agriculture of the city-born and of transplanting foreigners who find conditions and climate vastly different from those of the fatherland? Therefore the corn-belt has at last set itself to raising that greater and more valuable crop of farm boys and farm girls who find material comforts and ample financial recompense on the farm. The greatest factor in the raising of this new crop is education. . . . . But the farm boys and girls in order to be interested must be caught young. Before they are old enough to enter the land-grant colleges the lure of the city has entered their minds and the mischief is done. Raising bumper crops of corn and oats, the typically agricultural states of America have heretofore failed to raise satisfactory crops of stay-at-home boys and girls.

An editorial in another magazine revives the criticism which appeared against rural schools a few years before. It is entitled "The Martian and the Farm" (95) and makes the remarks of the supposed Martian who is represented as visiting an ordinary country school the basis of some pointed comments on the rural schools:

> I notice that these Americans seem to think the raising of crops to be quite unnecessary; and that they are applying their remarkable intelligence to the task of depopulating their rural regions. They have acuteness to see that if they are to drive people out of the country, they cannot begin with the adult population. Life in the open country is so alluring and so natural that even when it has not been made as complete as it might be, it holds people fast. So these far-reaching Americans, in order to crowd people back

into the cities, where they obviously want them to be, have devised a campaign of education directed toward the children. They have planned all their rural schools on city models. Even in such details as arithmetic problems, they see to it that the children's minds should be directed toward urban life. . . . . If this visitor were told what he interpreted as an astute campaign was a mere matter of stupidity and tradition, and that the American People were really wondering how they could check the congestion of cities, he would be forced, out of decent respect for the people he was visiting, to be incredulous.

How can a child born and reared in the country respect the life of the farmer when the community in which he lives does not regard the farmer's occupation worthy of study? How can he be expected to look with ambition toward agriculture as a vocation when he finds that training for it is regarded as less important than preparation for a clerkship? How can he think of village and rural life as anything more than a makeshift when he finds that in the schools he attends there is not a word taught concerning crops or cattle or roads?

The situation in this country is then contrasted with the national policy of rural education recently inaugurated in Canada and the importance of a similar movement in this country suggested. The criticism of the condition in rural schools as to their indifference to rural life does not go unchallenged. In a later number of the same magazine appears a reply in which the editor is brought to task for making implications that were not warranted by the facts in the case. The work in agricultural education of the Middle West is cited as a refutation. The writer in a five months' visit in Canada had been unable to see any reason for holding up the Canadian scheme for rural education as a model for this country (96).

Another letter of reply is published from a farmer who could see no more reason why "a country child should be taught how to run a farm than a city child should be taught how to run a bank."

It seems plain to me [he says] that the public schools are intended to give the young a practical education to prepare them for life, not to prepare them for any particular work in life. . . . . Why tax the community in general to instruct its children for work and life on the farm, when many of the patrons and many of the children themselves would prefer general education? (97).

The above editorial and its sequel, the two letters of reply, give some insight into the present situation. No doubt the condition referred to in the editorial does not apply to all rural schools but in general it is not much overdrawn. The writer of the first letter unduly magnifies the work of agricultural education in this country, for it has not had time to modify the ordinary rural schools to any considerable extent, even in the favored Middle West. On the other hand, his five months' visit in Canada failed to show him that the efforts of the Canadian educators are aimed directly at the rural schools. The second letter reveals an attitude which is familiar to those who have undertaken to hold up the chief interest of a rural community as a motive for better schols.

In reviewing the relation of popular periodicals to agricultural education only typical examples have been given. No attempt has been made to have the references complete. Sufficient citations have been given to indicate the character and scope of the discussions of the subject as they have appeared in these periodicals, and to show the service rendered by keeping the subject before the public, and by helping to secure a favorable attitude toward the improvement of rural schools.

Brief reference should be made also to periodicals whose circulation is limited to smaller groups of readers. There is a large number published in the interest of farmers. Most of them are local, being chiefly confined in circulation to a single state. Many are of doubtful value and are about as useful to the farmers as gold bricks. Those that are really sincere in their efforts to improve farm life have exerted considerable influence for the betterment of rural schools and for the introduction of agriculture. Special articles as well as letters from subscribers are published. The most important of these are reviewed from time to time in the *Experiment Station Record* of the United States Department of Agriculture (13) and need not be mentioned here except in this general way. On the whole, agricultural periodicals have maintained too conservative an attitude toward agricultural education, both as to colleges and elementary and secondary schools. One cannot avoid the suspicion that this

attitude on the part of some of these publications is not wholly disinterested. Agricultural education would, among other things, most certainly develop more critical readers, and this would soon react upon the circulation or upon the character of the matter published. Again, the fear of offending some of their readers, thus affecting circulation, makes the publishers cautious in giving space to views that might unsettle the faith of the fathers in the little one-room school.

Occasionally a well-written article on agricultural education appears in the more special periodicals. For example in a magazine "devoted to the philosophy of science" we find a discussion of "Agriculture the Basis of Education" (98). The writer regards the two primal contacts of the child, with nature and with parents, as more fundamental than all questions of subject-matter and methods of formal education. "The mental conditions of agriculture are just as essential to normal development of the human mind as air, food, and exercise for the development of the human body." He refers to the education of the early Greeks in support of his views: "The young Greek of the Homeric age appears to have had much more intimate and adequate contacts with nature and with his elders than our modern education provides, or even permits."

A similar conclusion as to the educational influence of agriculture, though discussed from an entirely different standpoint, is found in an article on "Farm Life as a Basis of Practical Education" (99). The subject for another discussion is the "Need for Agricultural Education" (100). The economic importance of this kind of education is urged. Another point of view is set forth under the title "Rural Education" (101).

> Rural education is but a section of the general school question; agricultural education is a branch of technical training. These two phases of education of the farm population meet at many points, they must work in harmony, and together they form a distinct educational problem.

Three difficulties are mentioned: (1) To secure a modern school equal to the city school; (2) to enrich and expand the curriculum so as to make it a vital and coherent part of rural-community life; (3) to provide adequate high-school facilities in the rural community.

BIBLIOGRAPHY

Only references cited by number in the text are included.

84. "Learning by Doing for the Farmer Boy." O. J. KERN. *Review of Reviews,* XXVIII (1903), 456–61.

A description of the Farmer Boys' Club organized in Winnebago County, Ill., February 22, 1902. It includes method of organization, educational excursions, experimental work of the boys, local meetings of the club, the club and the farmers' institute, future outlook of the club. There is also a short account of the first consolidated school in Illinois.

85. "Common-Sense Country Schools." ADELE MARIE SHAW. *World's Work,* VIII (1904), 4881–94.

An illustrated account of O. J. Kern's work among the rural schools of Winnebago County, Ill. It contains a good account of the Farmer Boys' Club.

86. "The New Education for Farm Children." WILLET M. HAYS. *Review of Reviews,* XXVIII (1903), 449–55.

The article is introduced by a general discussion of the educational situation, concluding that there should be a school system adapted to rural conditions. A scheme is presented for an articulated system of education adapted to rural needs: (1) consolidated rural school; (2) agricultural high school; (3) agricultural college. This is one of the first publications of the author's views on a system of rural education. His present views on this subject have been reviewed at some length in a previous article of this series (15).

87. "Teaching Farmers' Children on the Ground." GEORGE ILES. *World's Work,* VI (1903), 3415–20.

After a general discussion of rural education, its needs and shortcomings, the author gives an account of the program for rural educational reform, known as the Macdonald Consolidated Rural School Movement, which was to take effect in Canada the following September. A large number of interesting facts are given not only concerning this proposed reform but also concerning the agricultural work in general in Canada.

88. "Farmer Children Need Farmer Studies." CLARENCE H. POE. *World's Work,* VI (1903), 3760–62.

Reviewed in text.

89. "Agricultural High Schools" (Editorial). *Independent,* LVIII (1905), 334–36.

90. "Two Clear Aims in Education" (Editorial). *World's Work,* XII (1906), 7706–7.

These aims are (1) training for practical purposes, the machinery of which has been perfected only for the professions; (2) training for culture where public good is put before personal aims.

91. "Agricultural Education in the United States." J. C. MEAD. *Nineteenth Century,* LX (1906), 299–306.

A popular historical account dealing mainly with agricultural colleges.

92. "Agriculture in the Common Schools" (Editorial). *Independent*, LXIII (1907), 1508–9.

Two questions are raised: (1) Are the sciences underlying agriculture to be taught? (2) Where will teachers be found to give adequate instruction along such lines? Both questions are answered, the first by making use of pupils' everyday experiences, the second through training schools for teachers.

93. "New Work in Education." *World's Work*, XVI (1908), 10453–62.

Reviewed in text.

94. "Catching Them Young." F. G. MOORHEAD. *Technical World*, XI (1909), 612–18.

Reviewed in text.

95. "The Martian and the Farm" (Editorial). *Outlook*, XXIX (1909), 433–34.

Reviewed in text.

96. "Training for Farm Life." D. H. SMALLEY. *Outlook*, XXIX (1909), 811–12.

A reply to (95).

97. "The Automatic Farm." WM. HALSTEAD. *Outlook*, XXIX (1909), 812–13.

A reply to (95).

98. "Agriculture the Basis of Education." O. F. COOK. *Monist*, XVII (1907), 347–64.

Reviewed in text.

99. "Farm Life as a Basis of Practical Education." *Craftsman*, XVI (1909), 243–45.

Some of the plans of the Craftsman Farms are set forth. Active farm operation is regarded as the first step in creating an ideal school environment. "To use the idea of education seems as big and interesting as the whole of life itself. And the farm work which is necessary to make the land productive for our own maintenance and also to make the ground attractive to the eye seems to us to afford a series of experiments, the educational value of which no scientific laboratory could equal."

100. "Need for Agricultural Education." D. Y. THOMAS. *Annals of the American Academy*, XXXV (1910), 150–55.

The purpose of this paper is to "emphasize the advisability" of extending the work in agricultural education. "Education must be democratized and made to subserve the economic interest of man. This will not kill the cultural school but foster it. The man who wants to be a lawyer or a doctor or a teacher or a journalist will have a hundred opportunities where he now has one."

101. "Social Problems of American Farmers: Rural Education." KENYON L. BUTTERFIELD. *American Journal of Sociology*, X (1905), 615–19.

Reviewed in text.

DENTAL EXAMINATION OF SCHOOL CHILDREN

W. C. REAVIS
Oakland City, Indiana

The movement for dental examination of school children that has long been a matter of great concern in many European countries has come largely from two sources in America. First, public-health officials in their effort to cope with the problem of public sanitation have found that the schools, on account of the unhygienic condition of the mouths of many children, are centers for the spread of contagious diseases. Second, educators in their effort to make the school a more efficient institution for the conservation of everything that might influence the welfare of the largest number of children have found that one of the greatest factors in mental and moral development is the status of the child's physical condition. Hence, with a different end in view, both professions have been led to seize the same means, and as a result the hygienic condition and environment of the child are receiving more attention than ever before.

The attitude of the American public toward the care of teeth —especially children's teeth—has been one of gross neglect. Until recent years, the subject has not received a just amount of attention from professional men; neither has it received sufficient emphasis in the teaching of physiology and hygiene in the public schools. For these reasons, ignorance of the proper care of teeth is widespread. For example, an idea has seemed to prevail that teeth need no attention until they begin to ache. This common notion has resulted in the loss of millions of teeth that could have been saved by adequate dental care at the proper time.

The real seriousness of the situation forces itself upon us as a national problem when we look into the condition of children's teeth over the country at large, and examine a sufficient number of statistics to permit of definite conclusions

An examination of 172,000 school children of New York City[1] has revealed the startling fact that 95 per cent need the attention of a dentist; 75 per cent had never visited a dental office. Detailed examination of 7,608 children from a selected school district showed the following results by grades:

Grade	Number Examined	Number with Defective Teeth	Percentage with Teeth Defective
1A	678	427	62.9
1B	1,115	749	67.2
2A	951	660	69.4
2B	788	416	52.8
3A	663	358	54.0
3B	620	350	56.4
4A	533	227	42.6
4B	531	209	39.4
5A	338	101	29.9
5B	299	97	32.4
6A	314	91	29.0
6B	367	64	38.3
7A	212	76	35.8
7B	159	17	10.6
8A	134	64	47.7
8B	70	7	10.0
Total	7,608	3,913	51.4

At Brookline, Massachusetts, the wealthiest town in America, 75 per cent of the school children examined needed dental service. This clearly indicates that the ravages upon the teeth are by no means confined to the poorer class of people.

A recent dental examination of the children of Sidney and the country districts of New South Wales revealed the following conditions:

	Boys	Girls
Number examined	4,433	3,216
Permanent teeth decayed	14%	16%
Milk teeth decayed	30%	35%
Dirty mouths	15%	11.7%
Decayed teeth per pupil	4.2	4.8

Dental inspection in four representative schools of Cleveland showed 92.83 per cent, 97.1 per cent, 95.31 per cent, and

[1] For references for this and subsequent statements of statistics see bibliography at end of paper.

98.43 per cent defective mouths respectively, and 15,061 dental cavities out of a total of 2,677 children, or an average of 5.6 decays per pupil.

In Germany, of 20,000 children between the age of six and sixteen, 95 per cent had dental caries.

Free dental service in the public schools of Mexico showed that the entire school enrolment suffered from the propagation of dental defects. Dr. Maximo Silva, chief physician of the school of primary instruction, reports that all of the children have bad teeth. Irregularities are very common, mastication is bad, and most of the children suffer from gastric and intestinal catarrh.

Dr. Ottofy reports, after giving much time to the study of teeth among different nations, that the Filipino children have only five sound teeth out of every hundred, the American children have seven, the Chinese twelve.

These alarming proportions serve as only a few examples of actual conditions. Dr. Osler says:

> There is not any one single thing more important to the public in the whole range of hygiene than the hygiene of the mouth. If I were asked whether more physical deterioration was produced by alcohol or defective teeth, I should unhesitatingly say defective teeth.

Recruiting officers in the United States Army and Navy have long recognized the fact that a man with defective teeth makes an unreliable soldier or sailor. During the year 1906, out of the 18,000 young men rejected, 1,000 were refused enlistment on account of bad teeth alone; and in the British army out of 23,000 men refused enlistment for all causes, in one year, 5,000 of these were rejected for either loss of teeth or on account of decayed teeth.

The French sub-minister of war recently issued a circular regarding dental hygiene of the army, in which he shows that dental lesions have been responsible for much sickness. In 1903, on account of teeth alone, 1,845 soldiers entered the hospital for treatment amounting to 18,639 days. Now, recruits are examined before entrance and regularly every three months after, in order that habits of hygiene may be established and maintained.

Experiments conducted on nine men for a period of four and one-half months to ascertain the value of proper mastication and enjoyment of food showed at the end of the experiment that the men were able to do double the amount of work. In the light of this fact, we must inevitably conclude that there is a great waste in vitality to the child who is compelled to masticate his food with a set of grinders that cannot half perform their work.

There is no time in life when good digestion and assimilation are of such vital importance as in the public-school period in which examinations reveal the teeth to be most seriously impaired. If the teeth are allowed to rot during this lapse of time between the loss of the temporary set and the eruption of the permanent set, when the tissues of the body are calling for a large amount of building material, a great waste in body and mind is sure to result.

If the decaying deciduous teeth do not receive proper treatment, they often become sensitive and so tender to the touch of food that the process of mastication is slighted and the child forms the habit of bolting his food, a habit that insures indigestion with its retinue of ills. In addition to a decrease in weight that is sure to follow, Leonard P. Ayres has conclusively shown that the average number of grades completed is .29 per cent less than by those having no physical defects, and that school progress is 5.9 per cent slower.

Dental caries if allowed to exist become receptacles for the culture of disease-producing germs that not only drain into the alimentary canal, endangering the health of the particular individual, but also are scattered through the air by coughing and sneezing, thus spreading contagion to those around. One child with a very bad mouth may inoculate a number of others, regardless of how careful or clean they may be.

Dr. Christian Greve in his work on the *Prevention of Disease* declares that good care must be taken of the milk teeth, if the cutting of the permanent set is to be regular.

The first teeth must not be destroyed before their time, because inflammation and abscesses of these may injure the germ of the permanent tooth,

and because by early extraction abnormalities in position may arise. When a milk tooth is removed and the permanent tooth does not quickly fill up the gap, this becomes smaller by the approximation of the neighboring teeth, and the permanent tooth which subsequently appears must take an inclined position, i.e., forward or backward to the alveolar arch. On the other hand the milk teeth or their remnants must not remain too long in the mouth, but be removed in time to prevent similar ill effects.

Irregularities and abnormalities in shape and position not only injure the looks of an individual, but also are conducive to early decay. Particles of food lodge among the irregularities and are difficult to dislodge, and as a result decay is permitted to set in earlier and to go on more rapidly.

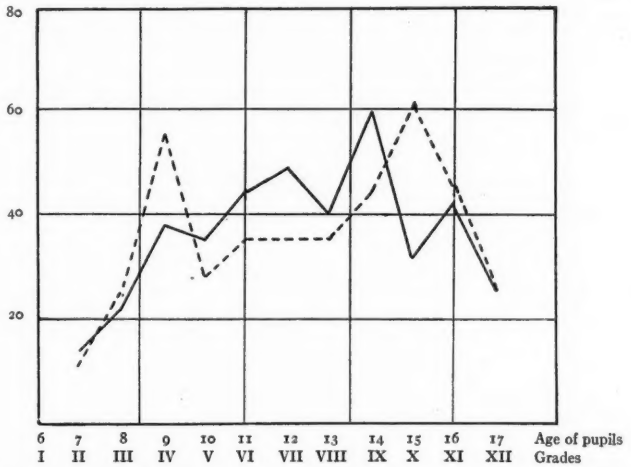
Dr. Holmes of the University of Pennsylvania reports a case where impacted dentition was found to be the cause of an extreme peripheral irritation that resulted in the moral delinquency of a boy, who speedily recovered after the extraction of the disturbing teeth. This clearly indicates that physiological activities going on in the jaws as a result of the exchange of deciduous and permanent dentures may be fruitful causes of serious reflex disturbances.

The common practice of parents has been to disregard the first set of teeth, thinking that, because they were short-lived, the sooner they were destroyed, the sooner they would be replaced by a sound permanent set. To see the fallacy of this notion, one needs only observe the conditions of decay of the first permanent molars that erupt between the sixth and seventh year, commonly called the sixth-year molars.

The following chart showing the results of an examination of the sixth-year molars of 400 school children at Oakland City, Indiana, last February, ought to convince the most skeptical that neglect of the temporary teeth means the rapid and early decay of the permanent set.

While the exact causes of decay in its larger aspects are not definitely known beyond the fact that certain sugar-splitting enzymes produce lactic acid that decalcifies the tooth structure, thus affording entrance for bacteria, a study of the above curves leads us to believe that decay is largely a matter of local infection, for 13.5 per cent of the sixth-year molars became affected

before they were a year old. The rapid decline in decay after the fourteenth year is due to the greater care exercised by the older pupils in regard to the sanitary conditions of the mouth and more frequent dental care. The importance of timely inspection and antiseptic treatment is imperative, for the removal of



AN EXAMINATION OF THE SIXTH-YEAR MOLARS OF 400 CHILDREN AT OAKLAND CITY, IND.

The unbroken line represents the percentage of defective sixth-year molars according to age of children examined.

The broken line represents the percentage of defective sixth-year molars according to the grade.

74 children had at least one molar decayed.
60 children had at least two molars decayed.
62 children had at least three molars decayed.
44 children had the four molars decayed.
147 children had molars in good condition, i.e., either sound or filled.

bacteria and decomposing food particles from the mouth prevents both decay and the spread of many diseases.

Until public sentiment crystallizes on this important question, the professional dentists must give of their time in cooperation with school officials to the hygienic education of the children and the public. Free dental examination of school

children and the circulation of good literature on the nature and care of the teeth ought to hasten the day when a free dental clinic will become a department of every city school system. Free infirmaries for the treatment of children's teeth have already been established in several American cities, and for several years they have been regarded as indispensable in many cities of Russia, Germany, Belgium, Sweden, Denmark, Italy, France, England, and Japan.

Because school boards are not yet ready to provide for the establishment of these clinics is no reason why dentists and school officials should do nothing to alleviate present conditions. With proper co-operation between these professions the public can be aroused and educated to a higher sense of hygienic betterment.

At Oakland City, Indiana, the question was brought before the teachers' and parents' association by the superintendent of schools and the local dentists, and a demand was at once made upon the Board of Education to permit the dentists to make an examination of the school children. Blanks were prepared showing the cuts of both temporary and permanent sets of teeth and the following facts were recorded: name and age of pupil, name of parent, name of teacher, number and location of decayed teeth, condition of mouth and remarks by the examiner in regard to the particular needs of the pupil. The blanks were printed in red ink and the secretary who recorded the observations of the dentist marked with a pencil X, O, or F to denote whether the tooth was decayed, out, or filled. The duplicates that were sent to the parents thus showed the location and condition of each defective tooth. A sample box of tooth paste with directions for the best use of a brush was given to each pupil examined.

In brief, the results of the examination were as follows: 407 children were examined, 53 had teeth in good condition, 210 had from one to four teeth decayed, 133 had from five to ten teeth needing attention, 1,616 defective teeth were found, 87 per cent of the pupils had bad teeth, with an average of 3.97 decays per pupil.

During the following three months 15 per cent of the children received dental attention and a great many who had previously neglected to care for their teeth formed regular habits of using the brush. The examination proved to be a great education to the children in hygiene, as well as the means of awaken-

Free Dental Examination

Name of pupil _____ Age_____

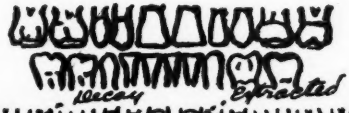
Name of parent _____

Name of teacher _____

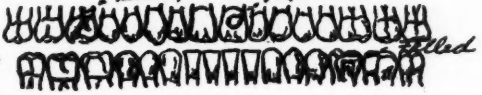
Has the pupil ever had any dental work done? _____

CONDITION OF TEETH

FIRST SET



SECOND SET



Remarks: Teeth marked need attention X

_____

Examined by Dr. _____

_____ Date_____ 191__

ing the parents to a greater sense of responsibility in the physical condition of the child.

With this mass of data at hand in regard to the prevalence of defective teeth and their known effects upon the individual child and the possibilities of endangering the health of associates, it seems that a fruitful field is open to all who are interested in social and hygienic betterment.

BIBLIOGRAPHY

MACKENZIE. *Medical Inspection of School Children*, 26–27, 255–65.
GREVE. *Prevention of Disease*, 267–97.
AYRES. *Laggards in Our Schools*, 97–100, 231–32, 192–99.
JOHNSON. "Condition of Teeth of School Children," *Ped. Sem.*, 8:45–58.
BURNHAM. "Hygiene of Teeth," *Ped Sem.*, 13:293–306.
CORNELL. "Physical Condition of School Children," *Psych. Clinic*, 3:134–35.
ROUTZAHN. "A City-School Clinic," *Chautauquan*, 40:571–72.
WEEKS. "Care of Teeth of Children," *Dental Cosmos*, 52:738–44. 1910.
"Condition of Teeth of School Children, New South Wales," *Dental Cosmos*, 52:755–58. 1910.
Editorial: "What Next?" *Dental Cosmos*, 52:798–801. 1910.
RUSHTON. "Abstract of Gov. Report," *Dental Register*, 64:68–75. 1910.
WHEELER. "Care of N.Y. Children's Teeth," *Dental Register*, 64:254–57. 1910.
Editorial, *Dental Review*, 24:70–73. 1910.
TALBOT. "Care of Mouths of School Children," *Dental Summary*, 30:517–18. 1910.
BARNES. "Dental Inspection in Public Schools," *Dental Summary*, 30:518–27. 1910.
MEINHART. "Lectures on Oral Hygiene in Schools," *Dental Summary*, 30:267–69. 1910.
EBERSOLE. "Report on Proposed Dental Education and Hygiene in Cleveland," *Dental Summary*, 30:234–41. 1910.
HOLMES. "Can Impacted Teeth Cause Moral Delinquency?" *Psych. Clinic*, 4:19–23. 1910.
"Early Care of Teeth-Deformity," *Dental Register*, 63:390–410. 1909.
Editorial, *Dental Register*, 61:485–86.
"Dental Hygiene in French Army," *Dental Cosmos*, 50:433.
"Dental Service in Public Schools of Mexico," *Dental Cosmos*, 50:604–5.
FERRIS. "Is Your Child's Face Beautiful?" *Dental Cosmos*, 50:1347–49.
WHITE. "Instruction in Oral Hygiene," *Dental Cosmos*, 50:313–16.
OTTOFY. "Teeth of Igrots," *Dental Cosmos*, 50:669–95.
WOODBURY. "The People's Disease," *Boston Med. Jr.*, 158:405–10.
BAKER. "Dental Caries as Factors in the Etiology of Other Diseases," *Boston Med. Jr.*, 158:401–5.
BELL. *Popular Essays upon the Care of the Teeth*, 131.
GULICK AND AYRES. *Medical Inspection of Schools*, 97–100, 231–32, 192–99.

EDITORIAL NOTES

Overwork at Home

One freqently hears complaints regarding the home study which is required of the pupils of our present-day schools. These complaints come from parents or appear in the newspapers in the form of interviews with some physician or nerve specialist. All sorts of evil consequences are laid at the door of overstudy, ranging in gravity from the breakdown of individual children to the general moral decay of the nation. In the meantime, the teacher is literally at his or her wits' end to find time for the various types of education which the modern school is expected to give. One cannot omit the work given in arithmetic in order to make room for the courses in drawing, or the parent who a moment ago objected that his child was doing too much will come forward with a complaint to the effect that his child is doing too little.

Errors at Home

The school should record its counter-complaint that parents consume too much of the time of children in frivolous doings which seriously disturb the routine of school. Too much social life, too much music, too much demand for assistance, too much neglect where watchful helpfulness would promote intellectual and physical development—these are the faults of parents. Many a child comes to school heavy-eyed and unable to pay attention to work because of the excess of engagements that have nothing to do with school. Here again there is another side, for the parent, anxious to give his child a well-rounded education, is at his wits' end to find time for the many very proper and beneficial types of social activity which offer themselves as possible.

The Problem of the Child's Program

The problem can never be solved so long as the teacher and the parent approach it from opposite points of view and throw accusations of usurpation back and forth in a spirit of enmity and distrust. The fact is that the problem is a general one. It is the problem of so conserving the child's time and energy as to give him the best that school and home can offer him. The child has a

right to expect wise elders to guide him to the organization of a program that will systematize his whole day. There is too much to be acquired in the present-day world for the child to throw away two-thirds of his time. He ought to be guided in his recreations so that he shall get the most out of them. He ought to have the opportunity for social life just as much as he has the opportunity for the use of books. He can have all these good things only by conserving himself. The analogy suggested by the word conserving is very strong. There was a time when as a nation we could afford to waste raw material. But our life has grown more strenuous and complex; the demands upon us are heavier and we find that we must systematize where formerly we proceeded without plan; we must save everything and turn it to use. So also with the time and energy of children. Where the school program was meager and the community so sparse that social life was less developed there was much time to throw away. Now, there is more than anyone can absorb, and he who uses the most is the master of the rest.

Is System Opposed to Spontaneity?

Someone will object that these suggestions promise to take all the spontaneity out of child life. Let the children be free and do not hang about their necks the millstone of a set program! If we must have a set program during part of the day let there be relaxation during the rest of the hours! These outcries are ill advised. The picture of children bursting out of a school where they have been repressed during a few hours of formal anguish is not just to our modern school. The child in school today has the relaxations of music, constructive work, and physical exercise. The old-fashioned delirium of recess was not a natural expression of child nature. The absorption of a modern boy in the interests aroused by school is not unnatural. There is such a method of organizing interests so as to set the individual at work and at play in a reasonably self-controlled manner. Variety can be introduced and the whole life so ordered that there shall be no demand for riotous outbreaks.

The school recognizes this now. Parents do not always realize to what an extent the regular school program is devoted to organized recreation. There is much in every school today which reaches over into the domain that used to be conceded to the home. The home has given up some of its duties to the school. All this readjustment means increased uniformity in the child's day and life. If he plays at ten o'clock in the morning it is fair that he should study at seven-thirty in the evening. If he studies hygiene at nine-thirty in the school it is consistent that he shall have a domestic program that will permit no breach of hygienic principles at the corresponding hour in the evening. A program does not mean sitting in a fixed position. It means an orderly arrangement of all one's duties and pleasures.

Concession in Both School and Home Engagements

Where then will flexibility come in? It ought to come in more than it does. The child who cannot carry a heavy program should have a light one for the whole day. The child who can carry more work ought to have the opportunity. Much of our trouble at the present time is due to our effort to make all individual programs alike. We ought to let one child work at one rate, another at a wholly different rate. The intelligent arrangement of individual programs is the largest problem of our modern education. The instructors in physical education have realized that school gymnastics must be fitted to individual needs and to the other activities of the individual. When will parents and teachers reach the same intelligent view regarding the intellectual and social life of children?

Individual Programs

BOOK REVIEWS

Education in Sexual Physiology and Hygiene. By PHILIP ZENNER, M.D. Cincinnati: Robert Clarke Co., 1910. 16 mo., pp. 128. $1.00 net.

Among the many subjects consideration of which is being forced upon teachers by social conditions is that of instruction in sexual physiology and hygiene. Dr. Zenner's book is entitled to be called a contribution toward a solution of the problem. It reports a series of lessons on the subject in an elementary school and also gives an account of the effect produced by these lessons.

There are also printed several talks to college boys, filled with the kind of information that a physician can best bring home to young men. There is, however, no indication as to the results of this instruction.

The last forty pages contain what might be termed a physician's message to teachers and parents. The author insists upon the necessity of instruction with regard to matters of sex, points out the possibility of doing injury as well as good, makes some suggestions about methods, and insists upon the need of proper preparation on the part of the instructor, whether parent, teacher, or physician.

The book makes no pretention to completeness; it recognizes the tentative character of the undertaking. Its suggestions are valuable.

W. L. EIKENBERRY

A Holiday with the Birds. By JEANNETTE MARKS AND JULIA WOODS. With Illustrations by CHESTER A. REED. New York: Harper & Bros., 1910. Pp. 211. 75 cents.

A Holiday with the Birds is a reader in the natural history of birds. The book is appropriate to be read by children in the intermediate grades. The first five chapters deal with general facts such as relate to feathers, preening, moulting, special senses, digestive and circulatory systems. Nine chapters deal with different characteristics and habits of members of the families of birds. Four closing chapters deal with the egg and the making of a bird; aunts, uncles, and cousins of the bird family; bird migration; and bird protection.

The entire book is in the nature of a conversation between three children, the summer tutor and companion, and other occasional members of their parties. The book suffers somewhat from the inconsequentialities and meaningless foreign frivolities that usually appear when attempt is made to manufacture conversation in order to present facts regarding nature. Nevertheless a large amount of dependable, valuable, and interesting bird lore is presented, and it is possible that the conversational style may increase the book's attractiveness to younger children. Teachers will certainly find the book stimulating and helpful as a nature reader for occasional use, and the story form doubtless will carry the interest of some children directly through the entire book.

O. W. C.

CURRENT EDUCATIONAL LITERATURE IN THE PERIODICALS[1]

IRENE WARREN
Librarian, School of Education, The University of Chicago

AYRES, LEONARD P. Relation between physical defects and school progress. Amer. Phys. Educa. Rev. 15:389–95. (Je. '10.)

BURNHAM, W. H. School hygiene in the children's institute. Pedagog. Sem. 17:183–88. (Je. '10.)

CHASE, HARRY W. Work with the backward and subnormal in the children's institute. Pedagog. Sem. 17:189–203. (Je. '10.)

ELLIS, DAVID A. Decade of school administration in Boston. New Eng. Mag. 42:521–24. (Jl. '10.)

FAIRMAN, CHARLES G. College trained immigrants. New Eng. Mag. 42: 577–84. (Jl. '10.)

GRINNELL, JOSEPH. Methods and uses of a research museum. Pop. Sci. Mo. 77:163–68. (Ag. '10.)

GULICK, LUTHER H. Report of the committee on the status of physical education in public normal schools and public high schools in the U.S. Amer. Phys. Educa. Rev. 15:453–54. (Je. '10.)

HALL, G. STANLEY. General outline of the new child study work at Clark University. Pedagog. Sem. 17:160–65. (Je. '10.)

HARRINGTON, THOMAS F. Health and education. Amer. Phys. Educa. Rev. 15:373–88. (Je. '10.)

Home science in the rural districts. Good Housekeep. 51:143–44. (Ag. '10.)

HOPKINS, MARY D. An American schoolgirl in Germany. Atlan. 106: 359–67. (S. '10.)

HORNE, HERMAN H. Principle underlying modern physical education. Amer. Phys. Educa. Rev. 15:433–39. (Je. '10.)

KARPINSKI, LOUIS. A unique collection of arithmetics. Pop. Sci. Mo. 77: 226–35. (S. '10.)

LIBBY, WALTER, COWLES, HELEN, AND OTHERS. Contents of children's minds. Pedagog. Sem. 17:242–72. (Je. '10.)

MCKEEVER, WILLIAM A. The moving picture. Good Housekeep. 51:184–85. (Ag. '10.)

[1] Abbreviations.—Amer. Phys. Educa. Rev., American Physical Educational Review; Atlan., Atlantic Monthly; Good Housekeep., Good Housekeeping; New Eng. Mag., New England Magazine; Pedagog. Sem., Pedogogical Seminary; Pop. Sci. Mo., Popular Science Monthly.

MAGNI, JOHN A. Department of child linguistics. Pedagog. Sem. 17: 213–18. (Je. '10.)

MEYLAN, GEORGE L. Effects of smoking on college students. Pop. Sci. Mo. 77:169–77. (Ag. '10.)

———. Report of the committee on the status of hygiene in colleges and universities in the U.S. Amer. Phys. Educa. Rev. 15:446–52. (Je. '10.)

(The) modern schoolhouse. Good Housekeep. 51:268–70. (S. '10.)

NIDA, WILLIAM L. The lighting of schoolrooms. Good Housekeep. 51: 263–67. (S. '10.)

ROTCH, THOMAS MORGAN. Roentgen ray methods applied to the grading of early life. Amer. Phys. Educa. Rev. 15:396–420. (Je. '10.)

SCHMIDT, CLARA. Teaching of the facts of sex in the public schools. Pedagog. Sem. 17:229–41. (Je. '10.)

SMITH, LEWIS WORTHINGTON. Literature and the pedagogue. Poet Lore 21:311–21. (Jl.–Ag. '10.)

SMITH, THEODATE L. Correspondence department of the children's institute. Pedagog. Sem. 17:176–82. (Je. '10.)

Special child surveys in Worcester by Clark students. Pedagog. Sem. 17: 219–28. (Je. '10.)

STECHER, WILLIAM A. Extension work in physical training in public elementary schools. Amer. Phys. Educa. Rev. 15:440–45. (Je. '10.)

TANNER, AMY E. Experimental didactics in the children's institute. Pedagog. Sem. 17:204–12. (Je. '10.)

WALLIN, J. E. WALLACE. The moving picture in relation to education, health, delinquency and crime. Pedagog. Sem. 17:129–42. (Je. '10.)

WELD, HARRY P. The mechanism of the voice and its hygiene. Pedagog. Sem. 17:143–59. (Je. '10.)

WILSON, LOUIS N. Library facilities for the work of the children's institute and the new building for this work. Pedagog. Sem. 17:166–75. (Je. '10.)